



IAEA

International Atomic Energy Agency

Nutritional & Health-Related Environmental Studies Newsletter

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To Our Readers

Greetings from hot and sunny Vienna!

It's time for our summer newsletter! I hope you will find some moments to review the updates of our activities. We have started a new inter-regional project that will help better understand effects of interventions addressing stunting, and a new African regional project, elucidating long-term consequences of acute malnutrition. We are presenting new projects in the area of HIV/AIDS in Chad and on exposure to health hazards such as persistent organic pollutants and resulting health effects in Marshall Islands.

You will also find updates on coordinated research activities. Links to our new outreach material and to new publications on vitamin A safety and environmental enteric dysfunction will provide you with more in-depth information.

Last but not least, our intern Kirsten, who we had to let go in June, shares her experiences and impressions from her time with us. We wish her all the best for her future endeavors.

I would also like to take this opportunity to welcome Alexia Alford (Murphy), our new nutrition specialist, who just joined us from the University of Queensland. She brings with her a wealth of experience on body composition assessment and nutritional care in childhood cancer.

Best wishes,

Cornelia



Cornelia Loechl, NAHRES Section Head, second from the left, during a visit to Indonesia. (Photo courtesy of IAEA)

Meetings

Writing a new chapter on the EED and undernutrition frontier: – A new IAEA coordinated research project

Efforts to understand the linkage between environmental enteric dysfunction (EED) and stunting and associated health outcomes have gained huge momentum with several meetings and systematic reviews since the technical meeting on EED organized and hosted by the IAEA in Vienna, from 28 to 30 October, 2015. Development of stable-isotope based test(s) for diagnosis and management of EED was recommended.

“The Carbon-13 Sucrose breath test was identified as a promising stable isotope method to assess gut function.”

In order to address this recommendation, the IAEA hosted a follow up technical meeting from 31 May to 3 June 2016 during which 15 experts from research and academic institutions, the Bill and Melinda Gates Foundation and IAEA Technical Officers from NAHRES discussed the design of a new coordinated research project (CRP) aimed at fostering the use of stable isotope techniques in the assessment of EED. In the CRP, these techniques will be useful in deciphering:

1. Dietary intake - direct measure of food intake combined with stable isotope measure of breast milk intake and assessment of nutrient absorption and metabolism;
2. Microbial translocation through the intestinal epithelial membrane and inflammation;
3. Human host response - growth and metabolic changes and risk for non-communicable diseases.

Promising methods identified

The Carbon-13 Sucrose breath test was identified as a promising stable isotope method to assess gut function. Other stable isotope techniques include Carbon-13 or deuterium labelled protein to assess protein bioavailability, doubly labelled water can be applied to assess total daily energy expenditure, while deuterium may be used to measure changes in body composition and breast milk intake. Nitrogen-15 can be used to assess infection and inflammation. A number of research questions were generated and prioritized to be addressed in the CRP. The water, assets, maternal education and income index (WAMI) was identified as an interim option for classifying individuals on a scale of risk for EED as a more objective clinical case definition is sought.

Upon approval by the Committee for Coordinated Research Activities, the new CRP will be open for submission of proposals from Member States.



Group photo during the technical meeting in Vienna. (Photo courtesy of IAEA)

Read more about EED here

A related story about the new CRP was carried on the IAEA web site:

[On the trail of Environmental Enteric Dysfunction and undernutrition](#)

Success Story

Atoms for health – Fighting obesity and micronutrient deficiency

The IAEA is mandated to promote the peaceful application of nuclear science around the world. Countries in Latin America and the Caribbean are benefiting from funding and projects supported by the IAEA to look into obesity, undernourishment and maternal health.



Listen to Steve Thatchet's podcast on how the IAEA supports countries' efforts to address the issue and improve childhood nutrition.

(Duration 3'28")

Meetings

Highlighting the long-term health consequences of childhood malnutrition in Africa

According to a joint UNICEF-WHO-World Bank Group joint report on levels and trends in childhood malnutrition (September 2015), Africa has seen the slowest reduction in the prevalence of stunting (from 42% in 1990 to 32% in 2014) compared to other continents [Asia (from 47.6% to 25%); Latin America and the Caribbean (from 24.5% to 11.7%)] in the same period. As a result of population growth, the absolute number of stunted children in Africa has risen from 47 million to 58 million, specifically in the Eastern, Middle and Western Africa sub-regions. The levels of wasting are unacceptably high across all African sub-regions (from 5.4% in Southern Africa to 9% in Western Africa). Paradoxically, the number of overweight children in Africa has also increased by 91% (from 5.4 million to 10.3 million).

“The absolute number of stunted children in Africa has risen from 47 million to 58 million, specifically in the Eastern, Middle and Western Africa sub-regions.”

Africa has witnessed some of the most concerted nutrition intervention programmes aimed at alleviating malnutrition. The use of ready to use therapeutic foods to treat severe acute malnutrition and supplementation with corn soy blends and ready to use supplementary/complementary foods to prevent and treat moderate acute malnutrition are widespread. Although, current food aid products and treatment guidelines have succeeded in reducing child mortality, evidence suggests that these interventions do not amount to much in terms of sustained reversal of malnutrition trends. Another important question is how early childhood malnutrition and treatment interventions impact on medium to long-term health outcomes such as risk for obesity and non-communicable diseases, and neurocognitive development.

The IAEA supports new regional project in Africa

In order to address these questions, the IAEA is currently supporting a regional technical cooperation project in Africa, where eight countries (Burkina Faso, Democratic Republic of Congo, Ethiopia, Kenya, Malawi, Tanzania, Uganda and Zambia) are jointly leveraging stable isotope techniques to assess body composition in children previously treated for acute malnutrition. The follow up age range is 2 to 30 years. The first coordination meeting attended by researchers from the above countries and field experts from Denmark and the United Kingdom was held at the IAEA HQ, Vienna from 11–15 April 2016. In addition to building scientific evidence on long-term metabolic cost of malnutrition, this project will foster South-South as well as North-South skills exchange and facilitate development of much needed human resource capacity through IAEA supported expert missions and scientific visits.



Group photo during the first coordination meeting of the regional project at the IAEA, Vienna. (Photo courtesy of IAEA)

Learn more about the project here...

[Leveraging nuclear techniques to better understand body composition](#)

Meet Suzanne Filteau describing the utility of body composition assessments conducted using isotope techniques.



Click on the image!

Two member states delineate the size and dimensions of the hunger challenge in their respective countries.



Click on the image!

Meetings

Workshop on intrinsic deuterium labelling of beans

Twenty six scientists and health professionals from twelve countries met at the Paris Institute of Technology for Life, Food and Environmental Sciences (AgroParisTech) from 11–13 May 2016 for a workshop on intrinsic deuterium labelling of grain legumes. The workshop was part of the IAEA Coordinated Research Project (CRP) on 'Bioavailability of proteins from plant based diets', and provided an opportunity for nutrition scientists to meet with agricultural partners to discuss the protocols that would be used in the CRP. All the participants were very excited about this opportunity, as it is not often that plant physiologists and plant breeders get to collaborate with nutritionists, but hopefully as the global agenda moves towards more nutrition sensitive agriculture, these kinds of collaborations will become more common. As well as the technical aspects of labelling beans with deuterium, and the studies of bioavailability of amino acids in humans, the environmental benefits of intercropping cereals with pulses, the need for 'added value' products to encourage farmers to grow more legumes, and the need for more discussion of protein quality among public health professionals were highlighted; in particular in defining a healthy diet, and the role of protein in prevention of stunting and malnutrition in children and women of childbearing age.

Year of Pulses raises awareness

This workshop was particularly timely as 2016 is the United Nations International Year of Pulses, which aims to raise awareness of the nutritional benefits of pulses as part of sustainable food production. The Year has created a unique opportunity to encourage connections throughout the food chain for better utilization of pulse-based proteins, further global production of pulses, better utilization of crop rotations, and to address the challenges in the trade of pulses.



Participants at the Paris workshop.
(Photo courtesy of Sarita Devi)

Check out these interesting links too:

[AgroParisTech](#)

[2016 International Year of Pulses](#)

Meetings

New strategies to prevent micronutrient deficiencies in young children

The final meeting of the Coordinated Research Project "Using Nuclear Techniques to Develop and Evaluate Food-Based Strategies to Prevent Micronutrient Deficiencies in Young Children" took place at IAEA Headquarters in Vienna, from 7–9 March 2016. First results generated during the project were reviewed and recommendations for potential new strategies for enhanced micronutrient intake in infants and young children in low-resource settings were formulated.

One of the studies examined iron absorption from amaranth enriched tortillas compared to traditional maize tortillas in Guatemalan toddlers. Preliminary results indicate that total absorbed iron was significantly higher from the amaranth enriched tortillas. Amaranth, therefore, seems to be a promising strategy for use as a complementary food in an effort to increase iron intake in young children.

Another study in Zimbabwe examined the vitamin A value (i.e., bioconversion efficiency of provitamin A to vitamin A) of kale, a green leafy vegetable, when prepared and consumed with lard or peanut butter (rich in protein and vitamin E). Results indicate that the addition of fat to processed kale (cooked and pureed) significantly enhanced the bioconversion to vitamin A in preschool children. Kale, therefore, should be promoted as part of a dietary diversification strategy to complement vitamin A intake from other sources.

Once the efficacy of these promising strategies has been confirmed, recommendations can be passed on to programme planners and policy makers to improve micronutrient nutrition in low-resource settings.



Meeting participants.
(Photo courtesy of IAEA)

Read more about the meeting here:

[Nuclear Techniques Can Help to Identify Strategies to Prevent Micronutrient Deficiencies in Young Children](#)

Meetings

The First Coordination Meeting of the Inter-regional Project

– Contributing to the evidence base to improve stunting reduction programmes

The Inter-regional Project is a development research collaboration initiated by the IAEA that grew out of a shared commitment to accelerate progress in preventing stunting. The First Coordination Meeting held in Dakar, Senegal from 11–15 April 2016, brought together government representatives and nutritionists from thirteen countries in Sub-Saharan Africa, Latin America and South Asia where stunting remains a public health problem. Also in attendance were experts from University of California Davis (UC Davis), UNICEF, the World Bank, the Inter-American Development Bank (IADB), CARE International and the IAEA to exchange experiences on implementing and evaluating different nutrition interventions. The meeting reviewed ongoing or planned interventions targeting the promotion of linear growth in children under five years of age in the participating countries and the evaluation of the main outcomes, and designed additional evaluation components using stable isotope techniques. Dynamic conversations regarding aims, objectives, study design, and future directions took place in one-to-one meetings with the senior statistician from UC Davis, USA and the IAEA experts.

“The meeting laid a solid foundation for implementing the stable isotope-based studies to evaluate programmes aimed at the reduction of stunting in children under the age of five.”

The project will tackle the assessment of hypothesized underlying causes for a low to moderate effect of nutritional interventions on stunting. These are:

1. Low adherence to breastfeeding promotion;
2. Altered absorption of nutrients, and;
3. High body fat mass as a proxy of nutritionally unbalanced diets and morbidity.

Evaluation of current interventions is of utmost importance in order to develop informed programmes targeting stunting reduction. The use of stable isotope techniques will help better understand the effect of the interventions on stunting.

The meeting laid a solid foundation for implementing the stable isotope-based studies to evaluate programmes aimed at reducing stunting in children under the age of five. The project is very challenging in terms of the number of countries involved, the spectrum of interventions to be assessed and the logistics required.



Meeting participants visiting the Laboratoire de Nutrition, Université Cheikh Anta Diop de Dakar, Senegal. (Photo courtesy of IAEA)

Human Health Campus

Check our informative resource website for health professionals

News

Testing potential nutritional care for HIV patients in Chad

More than 206,467 people live with HIV/AIDS (PLWHA) in Chad, 47% receive antiretroviral treatment (ART, DHS 2004). PLWHA benefit from free medical care since 2007; however, nutritional care is limited to dietary messages despite WHO recommendations to supplement the diet with micro- and macronutrients to enable lean mass restoration in PLWHA who are in the stage of weight loss. The WFP provided support in some areas distributing food baskets of cereals, legumes, salt and oil to the whole household. The programme was suspended because of its cost compromising its sustainability. It has been shown that weight loss >5% is associated with high risk of morbidity and mortality among PLWHA. To our knowledge, there is insufficient evidence in low income countries on effects of nutritional care on the health status of PLWHA.

The Ministry of Health sought technical and scientific support of the IAEA to generate the evidence on the effect of a three month-supplementation of PLWHA starting ART with millet flour fortified or not with spirulina on weight gain, lean mass (body composition assessment using the deuterium dilution technique) and other biochemical indicators.

Souheila Abbeddou, a nutritionist at NAHRES visited N'Djamena from 7–11 March 2016 with the objectives to evaluate the human and technical capacity to conduct the project, and to finalize the project design with the counterpart. During the visit, discussions with experts in



The medical care unit at the “Hôpital du Jour”, N'Djamena. (Photo courtesy of IAEA)

nutrition, food fortification and/or medical care of PLWHA took place. The medical care unit at the “Hôpital du Jour” in N'Djamena, WFP, UNICEF, REACH and the Association of PLWHA welcomed the idea of the project, which can provide the rationale for the integration of nutritional care for PLWHA in the country.

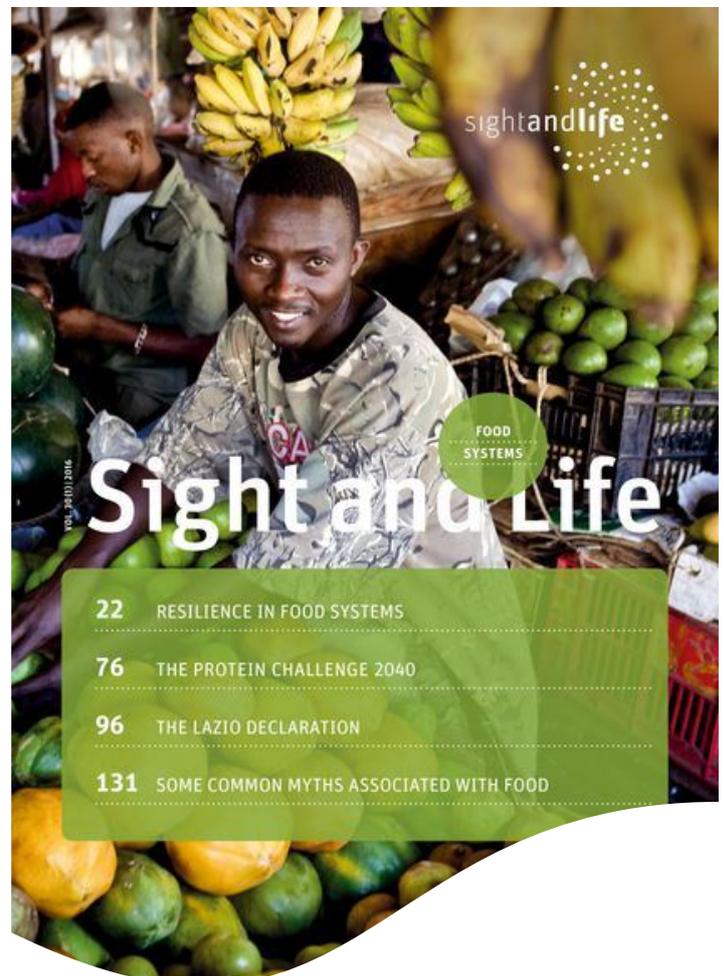
Awareness on advantages of applying nuclear techniques in nutrition was raised during the different meetings and

opportunities for future projects in the area of infant and young child feeding practices were discussed.

“The medical care unit at the “Hôpital du Jour” in N'Djamena, WFP, UNICEF, REACH and the Association of PLWHA welcomed the idea of the project, which can provide the rationale for the integration of nutritional care for PLWHA in the country.”

New article on EED

Sight and Life magazine has published NAHRES' article on EED



News

Persistent organic pollutants from a human health and nutrition lens: – The Marshall Islands story

A public health survey in the Republic of Marshall Islands (RMI) revealed unacceptable levels of persistent organic pollutants (POPs), mainly polychlorinated biphenyls (PCBs), heavy metals and organochlorine pesticides in fish tissue. The RMI government sought IAEA help to evaluate the problem and recommend pathways to build capacity to understand the scope of the problem, characterize the hazards posed by the toxic substances and set up a routine monitoring programme. This would ensure the safety of the Marshallese food supply and protect the health of their residents. A three-member team from the IAEA, including Victor Owino, Johannes Corley and Roberto Cassi, visited the Marshall Islands from 15–22 April 2016 on a fact finding mission. This mission revealed massive dumping of plastic and metal waste into the ocean, which is a likely contributor to the contamination of the fish stocks with POPs. Most of the fish consumed is caught within 100 metres of the waste.



IAEA Technical Officers and Marshallese Environmental Authority Director follow a walk through the magnitude of pollution. (Photo courtesy of R. Cassi, MESL, IAEA)

POPs are lipophilic (fat-loving), accumulate in fat tissue and pass from mothers to their infants in breast milk. Child exposure to POPs has been linked to being skinny at birth, increased levels of circulating insulin-like growth factor 1 (IGF-1) and rapid catch-up growth, a risk factor for obesity and non-communicable diseases later in life. There is a high prevalence of overweight and obesity among the Marshallese, with diabetes accounting for a huge number of deaths. POPs may be a contributing factor to the obesity epidemic, but more studies are needed to confirm this.

“Most of the fish consumed is caught within 100 m of the waste.”

Other contributing factors include changes in food habits and physical inactivity. Characterization of infants’ and young children’s exposure to POPs from breast milk and the resulting health effects will be necessary.

Addressing the issues related to POPs and other risk factors for NCDs in Marshall Islands call for strategies to physically remove contaminants from the environment, and promotion of good nutritional and lifestyle practices: diversified diet including vegetables and fruits, improved infant and young child feeding practices, and physical activity, among others. One example is growing vegetables under drip irrigation, which is being tested at pilot scale in Majuro. A few households have kitchen gardens. These best practices can be scaled up through behaviour change communication.



Pilot drip irrigation of fruits and vegetables in Majuro. (Photo courtesy of R. Cassi, MESL, IAEA)

Check out this article too...

A related story about the IAEA fact finding mission to the Marshall Islands can be found here:

[Marshall Islands Turns to IAEA for Help in Measuring Food and Environmental Pollution](#)

New Flyer

The IAEA’s role in nutrition programmes – link to PDF

The IAEA's Role in Nutrition Programmes

The International Atomic Energy Agency (IAEA) programme on nutrition enhances countries' capabilities to combat malnutrition for better health throughout life. It complements the work of other United Nations (UN) agencies, non-governmental organizations (NGOs) and interested stakeholders in the field of nutrition and health, by encouraging the use of accurate nuclear techniques (including stable isotopes) to design and evaluate interventions aimed at addressing malnutrition in all its forms with specific focus on: infant and young child feeding; maternal and adolescent nutrition; diet quality; prevention and control of non-communicable diseases (NCDs); and healthy ageing.

Examples of applications of nuclear and stable isotope techniques

- RESEARCH ON BREASTFEEDING**
Objectively measure whether a child is exclusively breastfed, and the amount of human milk consumed (using the deuterium oxide dose-to-mother technique). This method is used to assess accuracy of information reported by the mothers, effectiveness of breastfeeding promotion campaigns, and nutrient intake through human milk.
- RESEARCH ON MALNOURISHED CHILDREN**
Assess the success of re-feeding programmes for severely and moderately wasted children using body composition (lean mass and fat mass by the deuterium dilution technique) as an outcome indicator. Rapid catch-up weight gain could be associated with disproportionately higher amounts of body fat gain, which could lead to higher risk of NCDs during adult life.
- RESEARCH ON ELDERLY PEOPLE**
Assess body composition as an indicator of nutritional status reflecting the quality of the diet.
Measure bioavailability and bioconversion of provitamin A isotope labelled β-carotene.
Measure absorption and retention of iron and zinc, using their

SUPPORT MECHANISMS OF THE IAEA
These mechanisms include:

- The Coordinated Research Activities (CRAs), which encourage and assist development of and research on nuclear applications for peaceful purposes throughout the world.
- The Technical Cooperation (TC) programme addresses important development challenges of IAEA Member States by building capacity in the peaceful application of nuclear science and technology, where they complement or offer an advantage over other methods.

COORDINATED RESEARCH ACTIVITIES

- Call for research proposals
- Respond to research questions
- Small group of research institutes
- Duration: 4-6 years
- Small annual grants
- Regular research coordination meetings

TECHNICAL COOPERATION PROGRAMME

News

Eliminating borders: Out of the classroom and into the IAEA – A student visit of Bond University and Wisconsin University

On 21 March, NAHRES welcomed a group of eight Master of Nutrition & Dietetics graduate students and two faculty members from Bond University, Australia. Their visit was part of the course in international nutrition practice. The course explores “nutrition and dietetic practice from an international perspective, including consideration of the effects of different cultural, political, economic and physical environments on nutrition and dietetic issues and priorities and the nature of professional practice”.

“Both groups’ visits were aimed at gaining insight into the work of the IAEA and how nuclear techniques dovetail with nutritional and health-related environmental studies.”

Another group of 18 undergraduate students and four faculty members from the Wisconsin University, USA were received by NAHRES on 19 May. The students were participants in a multi-disciplinary 15 credit Certificate in Global Health.



Bond University students visit the NAHRES section at the IAEA Headquarters in Vienna. (Photo courtesy of IAEA)

Visit offers new opportunities

Both groups’ visits were aimed at gaining insight into the work of the IAEA and how nuclear techniques dovetail with nutritional and health-related environmental studies. The visit offered the students an opportunity for self-exploration, and NAHRES was able to share knowledge of its operations within the larger picture of the IAEA in sustainable development applications with the Technical Cooperation Programme, and in contributing to global research using nuclear techniques. Furthermore, a presentation made by the NAHRES intern, Kirsten Glenn, helped broaden the understanding of NAHRES’s functions and activities in human nutrition. The students also learned

of the opportunity to use the NAHU web-based Human Health Campus as a source of reference on the use of nuclear techniques in nutrition.



The students from Wisconsin in front of Belvedere Castle in Vienna. (Photo courtesy of Sherry Tanumihardjo)

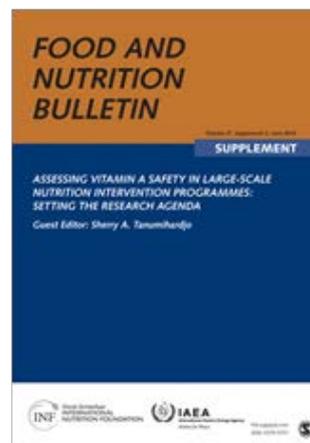
Visit the Universities online

[Bond University - Master of Nutrition and Dietetic Practice](#)

[Wisconsin University - Undergraduate Certificate in Global Health](#)

New Publication

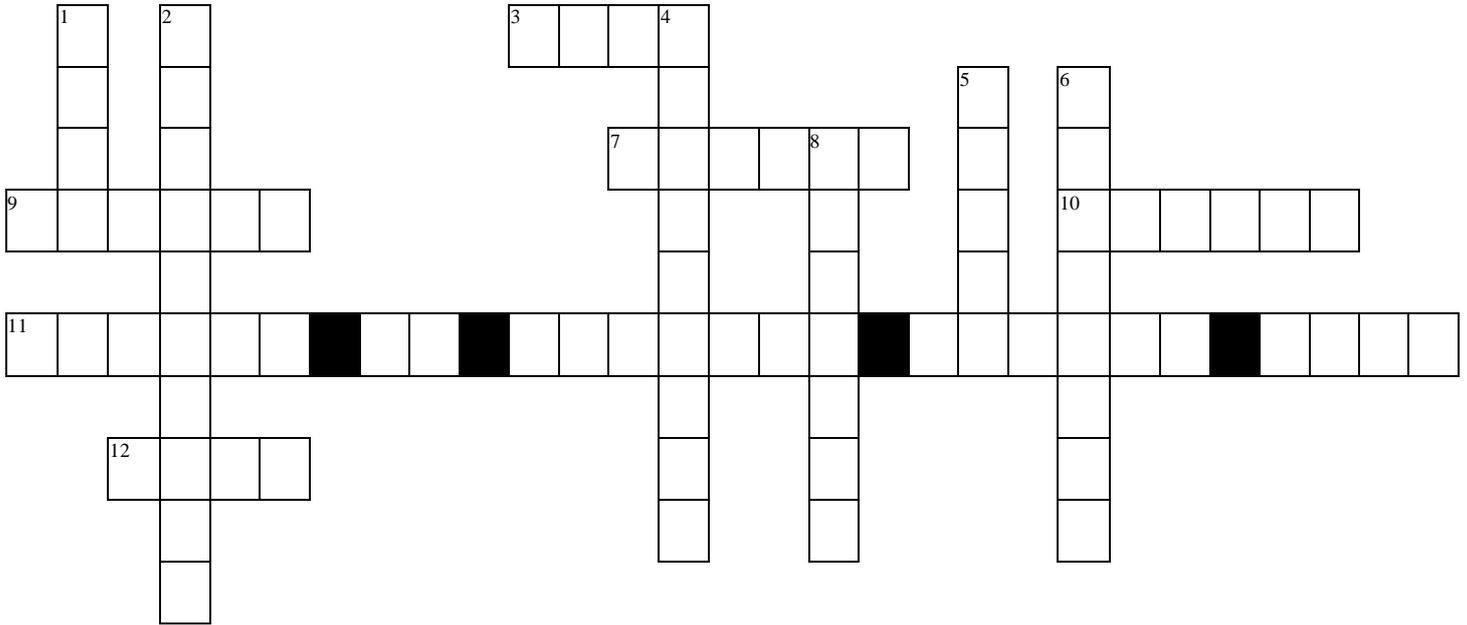
On the Human Health Campus website you can find a new IAEA publication with the title: “*Assessing Vitamin A Safety in Large-Scale Nutrition Intervention Programmes: Setting the Research Agenda*”. It is the result of a Technical Meeting co-organized by the International Atomic Energy Agency and the Bill & Melinda Gates Foundation in March 2014.



Click on the book cover to read the full articles.

Click here for more IAEA publications on Vitamin A available on our website “Human Health Campus”.

NAHRES Crossword Puzzle



Across

- 3. Name of one of the universities visiting the IAEA.
- 7. 2016 is the United Nations International Year of ____.
- 9. Abbreviation of Nutritional & Health-Related Environmental Studies.
- 10. Continent where the absolute number of stunted children has risen.
- 11. Promising stable isotope method to assess gut function.
- 12. Abbreviation of persistent organic pollutants.

Down

- 1. The Ministry of Health in Chad sought technical and scientific support of this organization.
- 2. Sixth word of “Sight and Life” article title, authored by NAHRES experts.
- 4. Used to measure changes in body composition and breast milk intake.
- 5. The First Coordination Meeting of the Inter-regional Project was held in this city.
- 6. Crop used to enrich tortillas with iron in Guatemalan toddlers during a research study.
- 8. Second “E” in the abbreviation EED stands for.

The NAHRES Team

Cornelia Loechl
 Christine Slater
 Alexia Alford (Murphy)
 Thabisile Moleah
 Victor Ochieng Owino
 Souheila Abbeddou
 Jesper C. Bové
 Inka Schaepe

Section Head
 Nutrition Specialist
 Nutrition Specialist
 Nutrition Scientist
 Nutrition Scientist
 Consultant
 Team Assistant
 Team Assistant

Feedback

The NAHRES Team appreciates your feedback! If you have any questions or comments, please send them to:

nahres@iaea.org

NAHRES Section News

Intern's Perspective

During the past year, I have had the privilege of working with the NAHRES team at the IAEA headquarters in Vienna, Austria. My internship gave me a first-hand impression of the day-to-day working environment of the IAEA and highlighted the importance of a science-based, integrated and policy-oriented approach towards addressing global nutrition problems, such as the double burden of malnutrition. I believe these areas must be addressed to successfully achieve the 2030 Sustainable Development Goals as well as the 2025 World Health Assembly Global Targets on maternal, infant and young child nutrition.

As a recent MSc graduate in *Environmental Technology and International Affairs (ETIA)*, jointly offered by the Diplomatic Academy of Vienna and Technical University of Vienna, and with a BSc in Nutrition Science, I was able to gain practical work experience at the IAEA in line with my fields of study. My time at NAHRES emphasized how nutrition science and the environment dovetail as issues - for example, I had the opportunity to participate in several high profile meetings, among them a technical meeting on environmental enteric dysfunction. This experience enabled me to acquire knowledge about nuclear techniques and their applications in the field of nutrition.

Throughout my internship, I was exposed to the work of the Agency and the United Nations as a whole and supported by outstanding and inspiring career professionals. By collaborating closely with people from different nationalities and scientific fields, I was able to grow professionally and further develop my language ability and cultural competency, as well as my organizational and writing skills. I helped improve the IAEA nutrition section's scientific and technical information outreach through contributing to numerous publications, such as: two editions of the NAHRES newsletter, the development of two flyers ("*The IAEA's Role in Nutrition Programmes*" and "*The IAEA's Role in*

Achieving Global Breastfeeding Targets Post-2015"), and several web-articles for the IAEA website. Furthermore, I am proud to say that I am a co-author of the article "*Technical Meeting on EED, the Microbiome and Undernutrition*" that was published in the latest issue of Sight and Life Magazine.

"Throughout my internship, I was exposed to the work of the Agency and the United Nations as a whole and supported by outstanding and inspiring career professionals."

All in all, I can recommend being an intern at NAHRES to any student who would like to gain work experience in the fields of nutrition and environment and insights into the UN system as a whole and the IAEA in particular.

Leaving the IAEA is a bittersweet moment for me: on the one hand, I am sad to leave such a great international, multicultural, fun and engaging team; on the other hand, I am excited about the adventures that lie ahead.



Kirsten in front of the IAEA headquarters, Vienna. (Photo courtesy of IAEA)

[Read the Sight and Life article here](#)
[Technical Meeting on EED, the Microbiome and Undernutrition.](#)

Impressum

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